

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN INCHES AND DECIMALS THEREOF ARE IN THOUSITHS OF AN INCH. DIMENSIONS ARE TO BE TAKEN FROM THE CENTER OF THE HOLE UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE TO BE TAKEN FROM THE CENTER OF THE HOLE UNLESS OTHERWISE SPECIFIED. DIMENSIONS ARE TO BE TAKEN FROM THE CENTER OF THE HOLE UNLESS OTHERWISE SPECIFIED.

REVISIONS				
DATE	BY	DESCRIPTION	DATE	APPROVAL
10-1-57	A	ADD FIN A		FD

# NOTES:

- OPERATION - THE CONVERTER MEMORY UNIT OPERATES WITH THE DISPLAY UNIT IN THE FOLLOWING MANNER: WITH THE DISPLAY ON/OFF LINE IN HIGH VOLTAGE CONDITION, A 9 WIRF BCD CODE (DEFINED BELOW) IS ENTERED ON THE DIGIT CODE LINES. THE 1776 LINES ARE AT A STEADY STATE VALUE WHEN THE STORE LINE TO THE MEMORY FOR THE "A" DIGIT IS CHANGED FROM LOW TO HIGH VOLTAGE. THE STORE LINE REMAINS AT THE HIGH VOLTAGE FOR 20 MICROSECONDS MINIMUM (SEE TIMING DIAGRAM), BEFORE RETURNING TO THE LOWER INHIBIT VOLTAGE. DURING THE STORE TIME HIGH VOLTAGE PERIOD, THE BCD CODE LINES DO NOT CHANGE.

INPUT	DIGIT DISPLAYED
8 4 2 1	
0 0 0 0	0
0 0 0 1	1
0 0 1 0	2
0 0 1 1	3
0 1 0 0	4
0 1 0 1	5
0 1 1 0	6
0 1 1 1	7
1 0 0 0	8
1 0 0 1	9

SIMULTANEOUS WITH OR FOLLOWING BUT NOT PRIOR TO THE RETURN TO THE INHIBIT VOLTAGE, THE BCD CODE CHANGES. THE PERIOD OF CHANGING IS APPROXIMATELY 5 MICROSECONDS MINIMUM. AFTER THE CODE LINES ARE AT A STEADY STATE VALUE, THE STORE LINE TO THE B DIGIT IS CHANGED FROM LOW TO HIGH VOLTAGE. THE SEQUENCE DESCRIBED ABOVE IS REPEATED UNTIL ALL DIGITAL MEMORIES HAVE BEEN SET TO THEIR DESIRED VALUES. AFTER AN INDEFINITE "ON" PERIOD, THE MEMORY IS RESET BY CHANGING THE DISPLAY ON/OFF SIGNAL TO LOW VOLTAGE CONDITION AND HOLDING FOR 20 MICROSECONDS MINIMUM.

## 2. ELECTRICAL CHARACTERISTICS

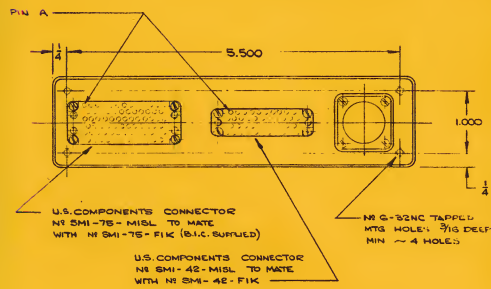
### A) POWER INPUTS

- 27 TO 29 VOLTS DC WITH LESS THAN 0.500 VOLT RIPPLE AT 200 MA.
- 10 TO 12 VOLTS DC WITH LESS THAN 0.5 VOLT RIPPLE AT 500 MA.
- 7 TO 9V VOLTS DC WITH LESS THAN 0.500 VOLT RIPPLE AT 2.5 AMP.

### B) SIGNAL INPUTS

- BCD CODE SIGNALS - 3-10 VOLTS INTO 3K FOR A "1" AND 0 TO 0.3 VOLTS FOR A "0".
- STORE SIGNALS - 3-10 VOLTS INTO 10K FOR THE COMMAND TO STORE AND 0 TO 0.300 VOLTS FOR THE COMMAND TO INHIBIT THE MEMORY.
- DISPLAY ON/OFF SIGNAL - 5 TO 30 VOLTS AT LESS THAN .5 MILLIAMPERES FOR A "DISPLAY" AND 0 TO 0.300 VOLTS AT LESS THAN 2 MA FOR A "NOT DISPLAY".

### 3. PIN CONNECTIONS - SEE SHEET #2



TIMING DIAGRAM

REQ'D BETWEEN NUMBER CHANGES.		ITEM	RECD	PART NO.	DESCRIPTION	MATL	MATL SPEC	UNIT WT
		LIST OF MATERIAL						
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS 2 7/32 DECIMALS = .005 ANGLES 2 1/2° DO NOT SCALE THIS DRAWING						
		MATERIAL						
		CONT NO. 70064						
		NEXT ASSY USED ON APPLICATION						
		SCALE FULL UNIT WT						
		CODE 99699 SHEET 1 OF 2						

DRAWING NO. DN3172  
SHEET 1 OF 2

BOWMAE INSTRUMENT CORPORATION  
8000 BLUFFTON RD.  
PORT WATKINS, MINN.  
DRAWING NO. DN3172  
CODE 99699 SHEET 1 OF 2

U.S. COMPONENTS CONNECTOR #SM1-75-MISL

U.S. COMPONENTS CONNECTOR /SMI-42-MISI

ON DN-3171  
CONVERTER OUTPUT  
BECOMES CONVERTER  
INPUT SEGMENTS A THRU G

ON DN-3170 (X<sub>1</sub>) = NORTH  
(X<sub>2</sub>) = SOUTH  
ON DN-3171 (X<sub>1</sub>) = EAST  
(X<sub>2</sub>) = WEST

NOTE THAT ON DN3171, DN3168, THIS PIN BECOMES SPARE

DRAWING NO.  
DN3172  
SHEET 2 OF 2

[illegible]

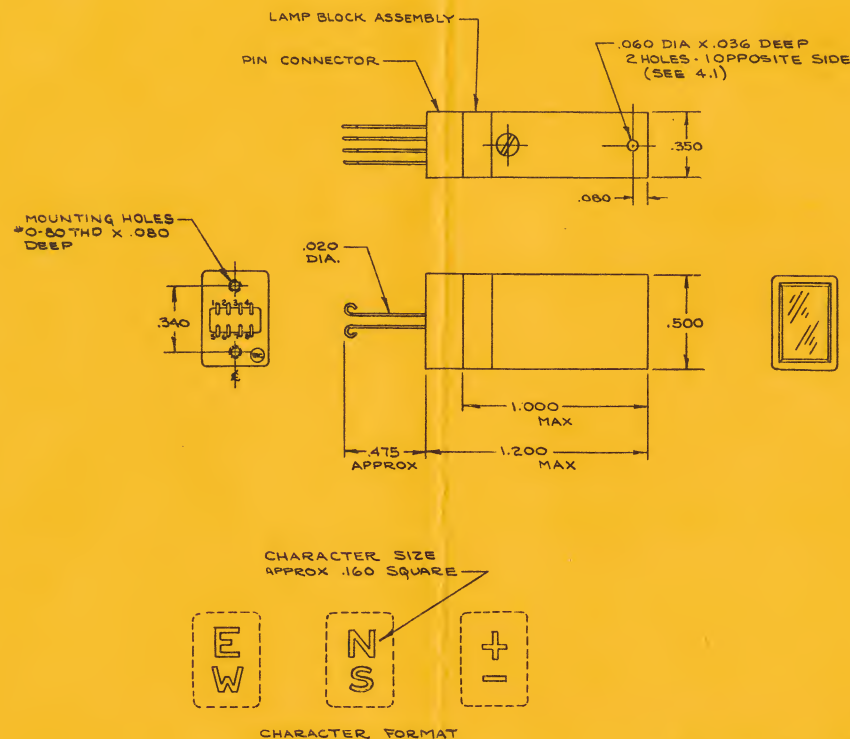


UNLESS OTHERWISE SPECIFIED

- 1-Do Not Scale Drawings.
- 2-Thread Length Dimensions Are for Full Threads.
- 3-Tolerances on Dimensions (Including Holes)

Decimal: .005  
Fractional: 1/2"  
Angular: 1/2°

- 4-Remove All Burrs and Sharp Corners. .005 Max.
- 5-Roughness of Surface Not to Exceed. 6.3 Microinches Rms.
- 6-Symbols  $\oplus$ ,  $\ominus$ , and  $\otimes$  Show that Surfaces Indicated by Arrows or Some Letters (e.g. (A)) Must Be Held Concentric, Square or Parallel Respectively Within the Limits Specified.



NOTES:

- 1.0 GENERAL DESCRIPTION - THE MODEL DN-3176 OPTICATOR IS A MINIATURE, SELF-ILLUMINATED, BRIGHT PRESENTATION, DISPLAY DEVICE, WITHOUT STORAGE CAPABILITIES. IT IS DESIGNED FOR COMPATABILITY WITH DIGITAL DEVICES AND COMPUTERS HAVING CONTINUOUS OUTPUT SYSTEMS.
- 2.0 ELECTRICAL CHARACTERISTICS
  - 2.1 INPUT VOLTAGE: SEE TAB
  - 2.2 CURRENT PER CHARACTER: SEE TAB
  - 2.3 POWER PER CHARACTER: SEE TAB
  - 2.4 ELECTRICAL CHARACTERISTICS ARE APPLICABLE ONLY TO NORMAL SUPPLY VOLTAGE AND NORMAL ROOM AMBIENT TEMPERATURES.
- 3.0 OPTICAL CHARACTERISTICS
  - 3.1 CHARACTER INTENSITY
    - 3.1.1 NORMAL INTENSITY - LIGHT INTENSITY OF ILLUMINATED CHARACTER AT RATED VOLTAGE: SEE TAB
    - 3.1.2 REDUCED INTENSITY - LIGHT INTENSITY MAY BE REDUCED BY REDUCING THE APPLIED D.C. VOLTAGE.
  - 3.2 CONTRAST
    - 3.2.1 RATIO OF ILLUMINATED CHARACTER TO ADJACENT BACKGROUND - 100:1 MINIMUM
    - 3.2.2 RATIO OF ILLUMINATED CHARACTER TO UNILLUMINATED CHARACTER - 100:1 MINIMUM.
  - 3.3 VIEWING ANGLE
    - 3.3.1 ALL CHARACTERS RECOGNIZABLE AT AN ANGLE OF  $\pm 45^\circ$  FROM BOTH THE HORIZONTAL AND VERTICAL CENTERLINE.
  - 3.4 EACH CHARACTER IS ILLUMINATED BY TWO LAMPS.
- 4.0 MECHANICAL CHARACTERISTICS
  - 4.1 TWO HOLES ARE PROVIDED FOR EXTRACTION FROM A PANEL DISPLAY.
  - 4.2 REPLACEABLE LAMP BLOCK ASSEMBLY.
  - 4.3 MATERIAL AND FINISH
    - 4.3.1 HOUSING: ALUMINUM BLACK ANODIZED PER MIL-A-8625.
    - 4.3.2 CONNECTOR: BLACK DIALYL PER MIL-M-14.
    - 4.3.3 CONTACTS: PHOSPHOR BRONZE GOLD PLATED.
    - 4.3.4 HARDWARE: NON-CORROSIVE MATERIALS
- 5.0 ENVIRONMENTAL
  - 5.1 ALTITUDE: PER MIL-E-5272C, PROCEDURE VI, CONDITION F.
  - 5.2 SHOCK: PER MIL-E-5272C, PROCEDURE V.
  - 5.3 VIBRATION: PER MIL-E-5272C, PROCEDURE XII, CURVE A.
  - 5.4 HIGH TEMPERATURE: PER MIL-E-5272C, PROCEDURE II.
  - 5.5 LOW TEMPERATURE: PER MIL-E-5272C, PROCEDURE I.
  - 5.6 HUMIDITY: PER MIL-E-5272C, PROCEDURE I.
  - 5.7 FUNGUS: PER MIL-E-5272C, PROCEDURE I.
  - 5.8 SAND AND DUST: PER MIL-E-5272C, PROCEDURE I.

DN-3176

A

INDIVIDUAL  
SIGNAL LINES

- 1
- 2 UPPER CHARACTER
- 3 UPPER CHARACTER
- 4
- 5 LOWER CHARACTER
- 6 LOWER CHARACTER
- 7 COMMON
- 8

FUNCTION  
DIAGRAM

OUTLINE NUMBER	CHARACTER DISPLAY	INPUT VOLTAGE	CURRENT PER CHARACTER	POWER PER CHARACTER	CHARACTER INTENSITY
DN-3176-9	PLUS-MINUS	4 VDC	142 MILLIAMPS	568 MILLIWATTS	800 MIN AVG FOOT-LAMBERTS
DN-3176-8	NORTH-SOUTH	4 VDC	142 MILLIAMPS	568 MILLIWATTS	800 MIN AVG FOOT-LAMBERTS
DN-3176-7	EAST-WEST	4 VDC	142 MILLIAMPS	568 MILLIWATTS	800 MIN AVG FOOT-LAMBERTS
DN-3176-6	PLUS-MINUS	4 VDC	132 MILLIAMPS	528 MILLIWATTS	400 MIN AVG FOOT-LAMBERTS
DN-3176-5	NORTH-SOUTH	4 VDC	132 MILLIAMPS	528 MILLIWATTS	400 MIN AVG FOOT-LAMBERTS
DN-3176-4	EAST-WEST	4 VDC	132 MILLIAMPS	528 MILLIWATTS	400 MIN AVG FOOT-LAMBERTS
DN-3176-3	PLUS-MINUS	4 VDC	106 MILLIAMPS	424 MILLIWATTS	200 MIN AVG FOOT-LAMBERTS
DN-3176-2	NORTH-SOUTH	4 VDC	106 MILLIAMPS	424 MILLIWATTS	200 MIN AVG FOOT-LAMBERTS
DN-3176-1	EAST-WEST	4 VDC	106 MILLIAMPS	424 MILLIWATTS	200 MIN AVG FOOT-LAMBERTS

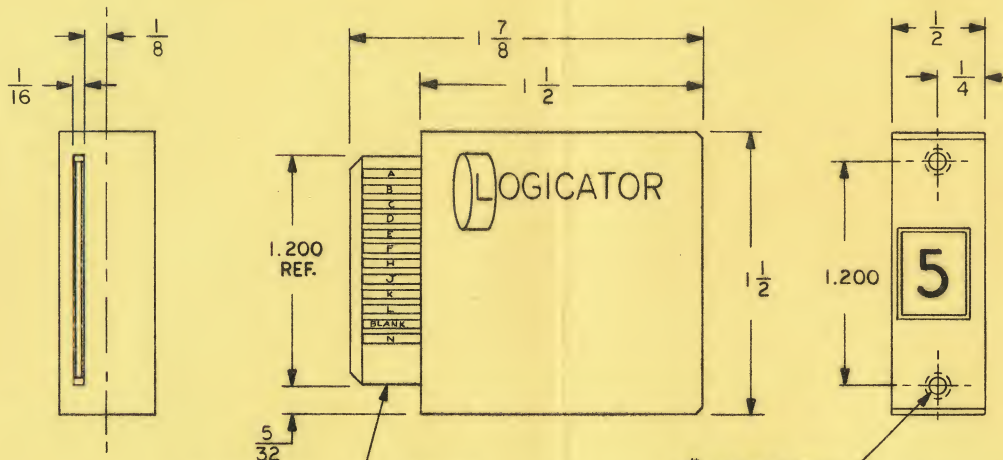
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DR. BY JDA		DATE 7/15/65		BOWMAR INSTRUMENT CORPORATION		CODE 99479		FORT WAYNE, INDIANA		ORIGINAL MODEL		50.812	
CK. BY		DATE		APD. BY		DATE		NAME		SIMILAR TO		DN-3176	
APPROVAL		DATE		APPROVAL		DATE		APPROVAL		DATE		APPROVAL	
PROTECTIVE FINISH		HEAT TREAT		SCALE		MATERIAL		NAME		DATE		DATE	

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# REVISIONS

SYM	DESCRIPTION	DATE	APPROVAL



P.C. BOARD TO MATE WITH KM-14S WINCHESTER CONNECTOR

#4-40-NC THD. MAX SCREW ENTRY  $\frac{3}{16}$ "

## DRUM MARKINGS

NO. PIN

0	A
1	B
2	C
3	D
4	E
5	F
6	H
7	J
8	K
9	L

GND-N

## NOTES:

- 1.0 GENERAL
- 1.1 A FAST RESPONDING DISPLAY UNIT WHICH IS PULSE-ACTUATED BY AN EXTERNALLY SUPPLIED ELECTRICAL DRIVE LOGIC. INTRINSIC MEMORY MAGNETICALLY RETAINS THE READOUT DRUM IN POSITION UNTIL A NEW PULSE IS APPLIED.
- 2.0 ELECTRICAL
- 2.1 VOLTAGE: +24V DC
- 2.2 POWER: 2.5 WATTS NOMINAL
- 2.3 OPERATING TEMPERATURE RANGE: -20°C TO +71°C
- 2.4 PULSE TIME: 500 MILLISECONDS
- 2.5 INPUTS: 10 PLUS COMMON
- 2.6 DUTY CYCLE: 50%
- 2.7 INSULATION RESISTANCE: 1,000 MEGOHMS MINIMUM WITH 500V DC APPLIED BETWEEN WINDINGS AND CASE.
- 2.8 HIGH POTENTIAL: 500V, 60 CPS RMS
- 3.0 MECHANICAL
- 3.1 CHARACTERS: STYLE PER MS 33558-ASG, 9/32 INCH HIGH AND NORMAL WIDTH, WHITE ON BLACK BACKGROUND.
- 3.2 VIEWING ANGLE:  $\pm 35^\circ$
- 3.3 WEIGHT: 1.5 OZ.
- 3.4 CASE: DULL BLACK

DRAWING NO. DN 3177

ITEM	REQD	PART NO.	DESCRIPTION	MATL	MATL SPEC	UNIT WT

## LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS $\pm \frac{1}{32}$ DECIMALS $\pm .005$ ANGLES $\pm 1^\circ$		CONT NO.	<div style="text-align: center;">LOGICATOR</div>	<b>BOWMAR INSTRUMENT CORPORATION</b> 8000 BLUFFTON RD. FORT WAYNE, INDIANA DRAWING NO. <b>DN 3177</b>
DO NOT SCALE THIS DRAWING		DRAWN BY <i>16</i> DATE <i>JUL 15</i> CHECKED BY DATE APPROVED MFG DATE		
MATERIAL		SCALE _____ UNIT WT _____ CODE <b>99479</b> SHEET OF		
NEXT ASSY	USED ON	APPLICATION		